Rural Lines

RURAL ELECTRIFICATION ADMINISTRATION • U. S. DEPARTMENT OF AGRICULTURE

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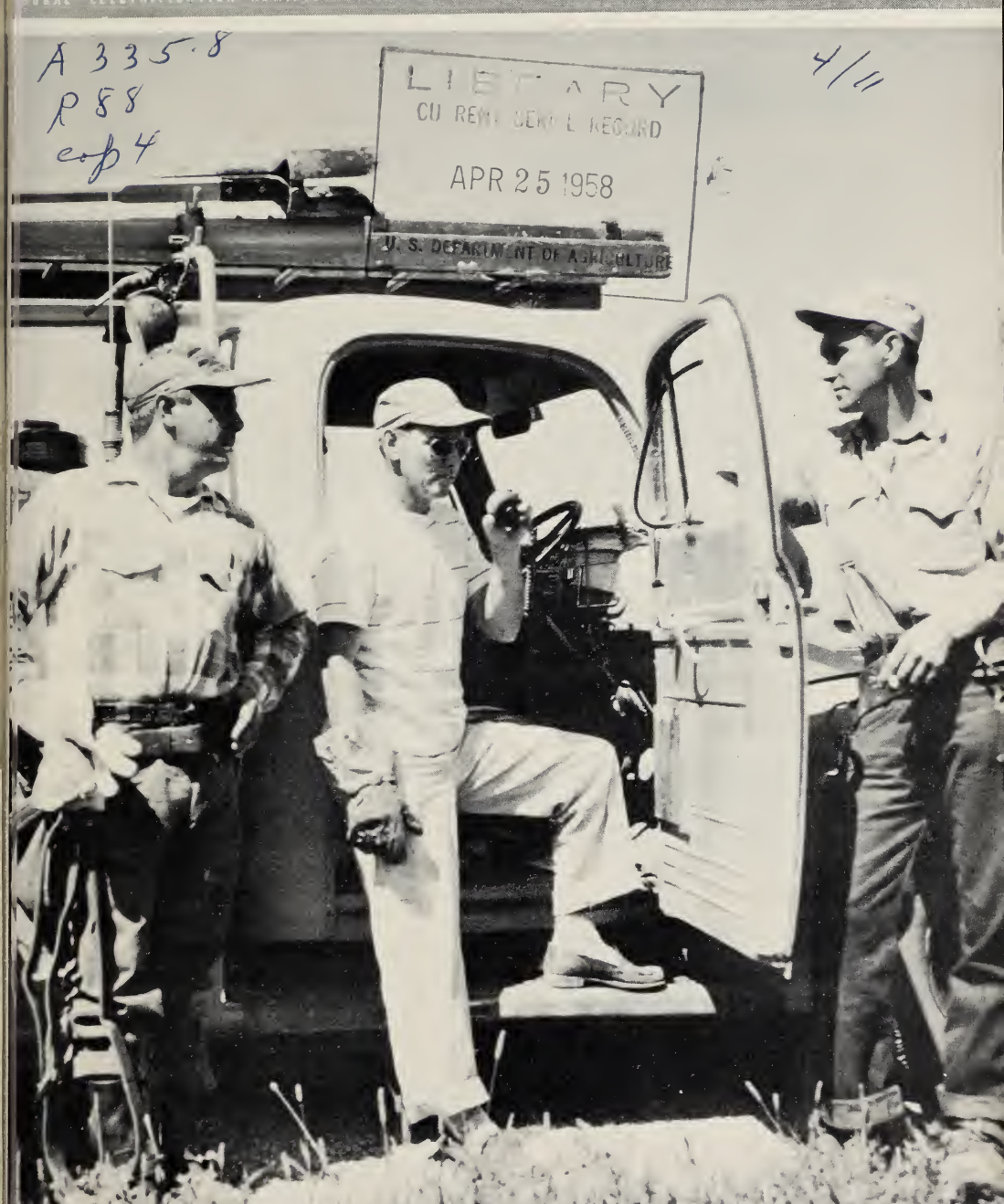

Two-way Radio As a Maintenance Tool.

See Page 5

A Message from the

ADMINISTRATOR

Last fall my younger son Jack and I went shopping for his first car. Because this one was to be at my expense there was a strong temptation to buy something about 10 years old. As we looked at various cars I thought less and less of that idea. I realized that even the best-kept 10-year-old car might not be safe enough for today's traffic conditions.

This experience reminded me that too many of us are putting up with hazards in our homes and on our farms—inadequate wiring. About half of the 4½ million consumers on REA-financed power lines live in houses wired before 1948. And in half of these, the wiring was done before 1944.

The danger is due not so much to the age of the wiring as the fact that we want to load those 1948 and older circuits with 1958 electrical living. Average monthly usage per farm consumer in 1948 was 121 kilowatt-hours; today it is above 300 kwh. On many rural systems average usage has pushed beyond 500 kwh. Many rural consumers are using their residential wiring systems to the limit.

Can the co-ops do anything about this right now? I believe they can. Most rural people usually plan to have a general cleanup around the premises in the spring. Co-ops might suggest to consumers that they check their wiring systems as a part of that cleanup and thus get their places in shape to make better and safer use of electric power. Where practical, the co-op might make a special offer to inspect the farm wiring.

Spring cleanup this year could be another step toward better electrical living for everyone.

Administrator.

David A. Hamil

Rural Lines

THIS MONTH'S COVER

An REA borrower's repair crew uses its mobile two-way radio to report a job completed and learn its next assignment. For telephone borrowers, mobile radio offers revenue possibilities as well as maintenance savings (see page 5).

Editor: Hubert Kelley, Jr. This month's contributors: J. R. Chambless, Louisan Mamer, George Dodrill, Frank Jolley, Jr., William Stokesberry.

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Dial Radiotelephones
Pass the Test

TWO makes of dial radiotelephones have passed 9-month REA field trials.

Equipment designed by an electronics manufacturer was tested in the system of the Central Virginia Telephone Corp., at Amherst. A different type of unit developed by a telephone equipment maker was tried in the Branford exchange of the North Florida Telephone Co., at Live Oak.

Field experience so far indicates that both makes of equipment were well designed. The number of "bugs" which engineers expect to find in any new equipment were few and easily corrected.

Dial radiotelephones didn't appear overnight. For several years, REA tried to interest radio manufacturers in designing and producing dial radio equipment. At first, manufacturers had some doubts about the potential market.

In May 1956, however, REA wrote specifications and telephone and radio makers were invited to submit bids for furnishing two mobile radiotelephone units, one rural subscriber station, and one base station with its associated antennas.

The specifications were written so that commercially available base and mobile radio equipment would be used as far as possible in the dial operated radio equipment. Bids from two manufacturers were accepted.

Both makes of equipment were designed for single channel, two-frequency operation in the 152-162 mc band. At present, there are six pairs of frequencies available in this band for mobile use. Two frequencies with a 5 mc separation are used for each channel—one for transmitting and one for receiving.

From a radio standpoint, the base station transmitter of both makes is similar to a conventional mobile relay station. It is on the air for the duration of each call and repeats the conversation received, whether it is from the exchange or from a radio-telephone subscriber. When it is on the air, busy lights go on in all mobile units.

Power output of the base station and one mobile unit is 50 watts. The second mobile unit and the rural subscriber station have a power output of 25 watts. Dialing and supervisory signals are received by the telephone exchange switching equipment as conventional signals.

At this point, similarities between the two makes cease. To make a call from a mobile unit, the radio maker's design uses electronic circuits primarily, while the other uses conventional telephone relays.

In one case the mobile subscriber removes the handset and momentarily presses a push-to-

talk button. This action transmits *rf* carrier to the base station, turns on the transmitters, and makes connections with the exchange to return a dial tone.

The subscriber then presses a button for each digit of the number he is calling. As each button is depressed, a code consisting of three tones is transmitted to the base station. There they are translated into the required number of conventional dial pulses and forwarded to the exchange switching equipment.

In addition to a pushbutton for each digit, there is an eleventh pushbutton on each mobile unit which permits revertive calls. By depressing this button, a mobile subscriber may call another mobile subscriber.

With the more conventional type, a standard rotating telephone dial is used on the control head of the subscriber sets. Except for a locking device to keep the handset from jarring loose, these units are similar to conventional cradle telephones.

Removal of the handset turns the transmitter on for about 2 seconds. This, in turn, puts the base station on the air, makes the necessary connections with the telephone exchange, and returns a dial tone to the mobile unit.

A mobile subscriber dials a number in the usual manner. As soon as the dial is moved off normal, a 2000-cycle gate tone is transmitted. This tone operates a slow-operate relay which removes a short from across a line pulse relay. It remains operated until the end of the pulsed digit. A 1500-cycle tone is pulsed as the dial returns to normal.

When the pulsed tone is received by the base station, it is converted to conventional d-c pulses and forwarded to the telephone exchange switching equipment to select any called subscriber. Both the gate tone and the pulsed tone must be received before any dialing can occur at the telephone exchange.

Both makes of equipment are designed to handle 10 subscribers on a full selective calling multiparty basis from a line circuit in the exchange. The service is similar to that on any multiparty line. Base station equipment can be modified to handle 20 or more subscribers by using an additional line circuit of the exchange for each additional 10 parties.

A telephone wire line subscriber can dial any mobile subscriber within range of the base station. Except for toll calls, a mobile subscriber can dial any wire line subscriber without the aid of an operator. Any type of call—such as revertive or direct distance dialing—that can be made by a wire line subscriber can also be made by mobile subscribers.

Subscribers using dial-operated mobile units may place calls when in areas of other systems that use mobile operators, such as Bell companies. The mobile operator will answer as soon as a mobile unit transmits its carrier, providing they operate on the same frequency. However, a mobile unit cannot be called unless the operator has a code-sending device compatible with the receiving selector in the mobile unit.

REA recommends that when an applicant files for a construction permit for base and mobile dial units, an application be filed also for a few stations to be operated at temporary fixed locations. A blanket license would authorize

installation of a station in case of disaster or civil emergency. Such a station could be operated for 6 months without notifying FCC of the temporary location.

In Cameron, La., for example, the Cameron Telephone Co. is installing equipment to provide emergency radiotelephone service to three communities where wire lines were wrecked last year by Hurricane Audrey. A borrower experiencing a similar disaster could, under a blanket license, use dial radiotelephone equipment to provide prompt emergency service to subscribers.

In addition to equipment already tested, dial radiotelephones soon will be available from two other companies producing electronic devices. When these firms have equipment available, REA will field test it in borrowers' systems.

Mobile Radio Installations

May Cut Maintenance Costs

MOBILE two-way radios frequently pay their way, particularly in thinly settled areas, by cutting outside plant maintenance and construction costs, according to a number of REA telephone borrowers.

Since dial radiotelephones have just arrived on the market, the borrowers who report these savings offer dispatch service only. Their radios are not interconnected to the dial exchange, and telephone office employees relay messages to and from mobile units during regular working hours. While this 9-hours-a-day service is of limited value to subscribers, borrowers say it is a valuable maintenance tool.

One manager claims that since he first installed mobile two-way radios in his vehicles, his system has gone through a blizzard, an ice storm, a weekend of tornadoes, and two sieges of wet cable. At times during this rough weather, says Charles M. Means, manager of South Plains Telephone Cooperative, Lubbock, Texas, all telephone communications were out. Radio was his only contact with repair crews. Because he could work via radio, Means says he was able to make more effective use of his crews and avoid excessive truck mileage.

During the cleanup after tornadoes struck, Means' contractor installed two radio units in his own vehicles. Telephone men scouted ahead for twister damage, then directed the contractor's men to d i s a s t e r locations, equipped with necessary material to rebuild the lines.

Means feels sure that service was restored to members in about half the time it would have taken without radio communications.

But it doesn't take a storm to prove the value of mobile service. O. S. Soma, manager of the Golden West Telephone Co-op, Wall, S. D., finds that his system's area is so large and his crew so small that two-way radio is "essential" to his operation.

"Without it," he insists, "I

would estimate that our maintenance and operation costs would increase approximately 20 percent."

Radio is valuable when making alterations in the system, too. From Union Point, Ga., President J. H. Darby, of The Union Point Telephone Co., writes that a new rural roads program has forced him to move many telephone poles. Since lines are out of order while moving takes place, crews use radio to check instructions with the office, to block out a line that is being moved, and to make tests on lines after moving is completed.

"There are thousands of uses for two-way radio in my telephone system," Darby claims. "It saves money and time, and helps us to render much better service in every way."

In Dodge City, Kans., a telephone borrower found that his maintenance expense dropped about 20 cents per subscriber after installing two-way radio in maintenance vehicles.

"How much of this reduction is due to the radio equipment would be anybody's guess," says Manager Carl B. Brecheisen, of the United Telephone Association, Inc. "We feel, however, that this equipment is saving us considerable expense. We are able to get more work per day out of our maintenance men, since it is easy to direct them to trouble spots without duplicating their trips."

Brecheisen is certain, he adds, "that it is one of the best investments this company has ever made."

Reporting savings in another way, General Manager Harold I. Ericson, of Minnesota Central Telephone Co., Hector, says his system, which now serves 2,807 subscribers, has saved the cost of one maintenance man and vehicle, thanks to increased efficiency stemming from use of two-way radio. And Norman Gibbons, president of Purdy Telephone Co., Purdy, Mo., noted that average mileage for a trouble call dropped from around 30 miles to 15 or 20 miles after he installed two-way radios.

This informal REA survey of borrowers using dispatch-type two-way radios produced no dissenting votes. This experience has created interest among other borrowers, leading to inquiries about loans for installing such equipment. REA is prepared to make loans where need and demand for mobile two-way radio service exists.

With dial radiotelephones coming into the picture, borrowers will be able to select the system best suited to their needs and the requirements of their subscribers. Under rules of the Federal Communications Commission, either dial or dispatch service may be used by a borrower for its own maintenance vehicles if the service also is offered to the public.

A dial mobile unit installed costs about $950, compared to $650 for a dispatch-type unit; a dial base station with antennas costs around $4,000, against $2,000 for a dispatch base station. Only the dial system, of course, can offer 24-hour-a-day mobile service to subscribers, but borrowers should make sure they have at least five signed subscribers who are likely to be permanent before investing in the more costly dial installation.

In some areas, five subscribers

may prove easy to find. L. John Denney, president and general manager of the Central Virginia Telephone Co., Amherst, where radiotelephones were tested (see p. 3), reports that he has several prospects willing to pay $35 a month for dial mobile units. His prospects include two physicians, several pulpwood buyers, a traveling tire retread service, owner-drivers of four taxis, and a guard at a local girls' college. In many places, Denney points out, local law enforcement officers would be logical prospects, too. In his town, however, police had installed their own two-way radio system recently.

Whichever type of mobile system a borrower finally selects—dispatch or dial—it should prove its worth quickly by helping managers in thin areas to make more efficient use of both employees and vehicles.

Phones and Co-op Officer Diminish Fire Risk

FARM families in the western North Carolina farm and forest area served by Yadkin Valley Telephone Membership Corp., Yadkinville, are resting easier these days. They have their own fire department.

Spurred by co-op leaders, they organized and equipped themselves to fight fire with the Farmington Volunteer Fire Department.

Three fire trucks—two of them purchased from Army surplus—include a fogger model to smother fires, a water pumper, and a 1600 gallon tanker, plow, and bulldozer for fighting forest fires. A modern building houses all the trucks, and there are two-way radios in all volunteers' automobiles.

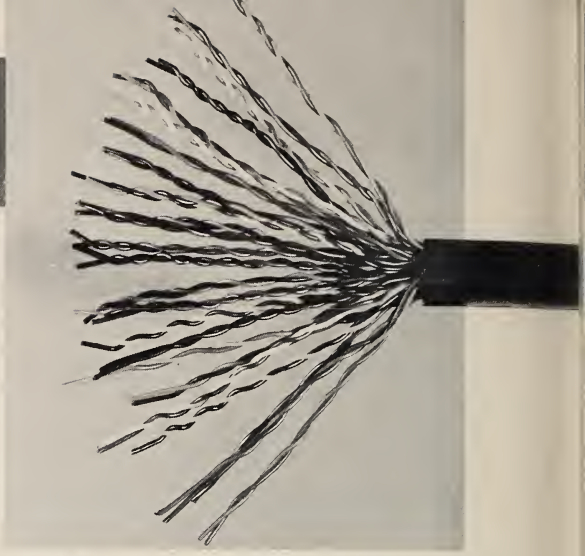
Wade Croce, telephone co-op vice president, is fire chief.

The co-op's network of 2,300 phones in Yadkin and Davie counties bring in fire reports to a funeral home, where someone is on duty 24 hours a day. By pushing a button, the duty man simultaneously alerts all firemen, sets off a siren, unlocks the fire house with an automatic electric relay, and turns on the lights in the station. Fire trucks are equipped with warmers on the motors and can get under way in seconds.

Funds were raised by Croce and his volunteer aides by ringing doorbells. Any donation was accepted, including a bushel of potatoes. Most ran to $10 to $20; the largest was $200. But it was enough.

Firemen raise money to maintain the department in an annual spring clean-up drive. They ask people to get rid of the rubbish in their attics and cellars; the firemen pick up the discard—everything so far from a grandfather's clock to an old deer rifle—and carry it to a central location for a rummage sale. During each of the last three years, the sales have netted the firemen about $2,000. A series of ham suppers in the summer and a turkey shoot in the fall bring in another $4,000 a year. As a result the department is out of debt—with a surplus in its treasury.

FULL COLOR CODING for TELEPHONE CABLE



A COLOR code so simple that anyone can memorize it in less than an hour becomes an REA Standard for telephone cable pairs on May 1.

The code was written by REA consultants and engineers. It has been widely adopted by the telephone industry since its presentation at an REA Industry Meeting last November, and the new fully color-coded cables already are available from most cable manufacturers.

Color coding as such is no stranger to the industry. It has been a useful tool for years. As a general rule, however, fully color-coded cables have been used only in switchboards and at terminal points. Insulated with silk and cotton, they were far too expensive for outside plant use. As a result, distribution cable remained something of a mystery to everyone but the expert.

It isn't hard to see why. The old type of cable was sheathed in a jacket of lead and antimony. Inside, each conductor wire was wrapped in paper. Since technical difficulties prevented development of a cheap, practical means of coloring paper wrappings, each pair inside the cable looked exactly like all others. Sometimes, a splicing expert spent hours testing this maze of wires before he located the pair he wanted.

And his job wasn't over when he found the right pair. Since paper-wrapped conductor wires are anything but waterproof, he had to take elaborate precautions to keep moisture from getting inside the cable. Then he had to seal the lead sheath with great care. It was no task for an amateur.

During World War II, the lead shortage spurred an intensive industry search for new types of sheath material. Polyethylene emerged as the best bet, and it also offered the first real hope for a fully color-coded cable. Polyethylene plastic was tough, waterproof, and easy to color.

As the new plastic replaced both the lead cable sheath and the paper wrappings on individual

conductor wires inside the cable, the splicer's old battle against moisture was just about over. Now that each separate wire was waterproof, there no longer was any need for tight seals at splice and terminal locations.

But every new invention brings new problems. If the industry was going to enjoy the benefits of waterproof conductors, engineers realized that the plastic insulation would have to be kept intact. Splicing experts could probe paper-wrapped wires with test picks, but they couldn't do that with plastic-insulated wires. It was essential to find some way to identify pairs without testing each one.

Color proved to be the answer. From the first, however, REA consultants were limited in the number of colors available. Since polyethylene is colored by the addition of dye to the hot mix, only solid colors could be obtained. Shades were out of the question, since colors had to be distinct from one another. A few experimental colors, like gold, proved too expensive. Finally, all were eliminated except 10.

The 10 solid colors were enough to do the job. Using combinations of them, the remarkable new code permits quick identification of any pair of wires in a cable—even when it contains 400 different pairs. The tip and ring wires in each pair also are distinguishable by color. Testing is eliminated.

In drafting the code, REA consultants selected five colors—white, red, black, yellow, and violet—for tip conductors; the other five—blue, orange, green, brown,

Conductors

Pair No.	*Tip*	*Ring*	*Pair No.*	*Tip*	*Ring*
1	White	Blue	13	Black	Green
2	"	Orange	14	"	Brown
3	"	Green	15	"	Slate
4	"	Brown	16	Yellow	Blue
5	"	Slate	17	"	Orange
6	Red	Blue	18	"	Green
7	"	Orange	19	"	Brown
8	"	Green	20	"	Slate
9	"	Brown	21	Violet	Blue
10	"	Slate	22	"	Orange
11	Black	Blue	23	"	Green
12	"	Orange	24	"	Brown
			25	"	Slate

Group Binders

Group No.	*Binder Colors*	*Group No.*	*Binder Colors*
1	White—Blue	9	Red — Brown
2	" Orange	10	" Slate
3	" Green	11	Black Blue
4	" Brown	12	" Orange
5	" Slate	13	" Green
6	Red Blue	14	" Brown
7	" Orange	15	" Slate
8	" Green	16	Yellow Blue

Figure 1—New Color Code

and slate—identify ring conductors. Colored wires were combined to produce 25 distinctive pairs, as shown in Figure 1. All these combinations appear in REA Standard 25-pair cable.

In the new 50-pair cable, there are two identical groups of color-coded pairs. Each 25-pair group, however, can be identified by a colored binder composed of colored threads, colored tape or imprinted tape, which is wrapped around it. Group binders follow the same color scheme as the insulation on conductor wires. For example, in 50-pair cable, the first 25-pair group is bound by a white-and-blue binder, the second group is bound by white-and-orange binder. A plantman searching for pair number 31 simply opens the cable, fastens the binder at each end of the opening around Group 2, and selects the only red-and-blue pair of conductor wires in the group. He knows that red identifies the tip wire and that blue marks the ring wire. He has positively identified pair number 31 in a matter of seconds.

Pairs	*Gauge*
2	19
4	19
6	19
12	22
12	19
18	22
18	19

Figure 2—New Sizes for Multipair Distribution Wire

Along with the color code, other new REA cable specifications become standard on May 1. The so-called "spare," or extra pair, has been eliminated from all cables, with manufacturers now guaranteeing all pairs.

Specifications also are being rewritten on multipair distribution wire, as shown in Figure 2.

The new 12 and 18 pair, 19 gauge sizes will be made available with a stronger support wire, permitting longer spans and more economical construction. The same color coding will be used for multipair distribution wire as is used in cables up to 18 pair in size.

The color code and other changes will benefit REA borrowers and others in a number of ways. Since tight seals at terminals will be unnecessary, it will be possible to use the ready-access type of terminal. This will provide a means for making service connections to any cable pair at any terminal point along the cable. Borrowers will be able to use any pair of conductors in a cable, since a plantman will have ready access to any pair within a few moments.

The changes will result in simplified cable plant design and layout, and lower construction costs. Since the color code does away with testing pairs to identify them, the cost of conductor identification and splicing will be reduced by at least 50 percent.

Rearrangements in plant will be completed easily and quickly to fit service needs, and additional pair appearances at terminals can be handled by company personnel. This will mean reduced annual costs and lower operating costs.

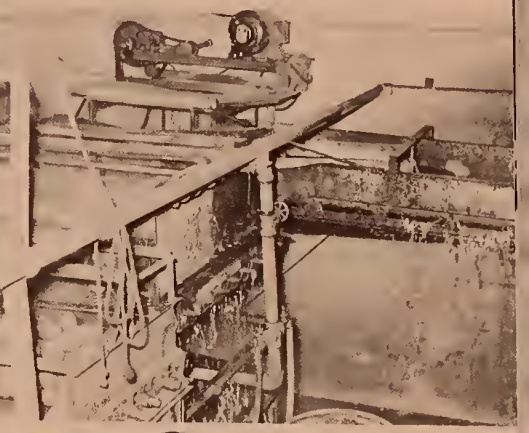
Rural Lines

Replacing poles before they fall—
See Page 14

Electricity takes over on the Horswell Potato Farm as soon as the truck from the field pulls up. Two of the 12 motors in the grading line can be seen operating the truck hoist and the first link of the conveyor belt. A wagon unloading mechanism is on the other side of the truck.

At the first sorting device in the packaging assembly line, small potatoes or those damaged by the digging machine are rejected.

on-the-farm PACKAGING PLANT



Entering at the left, potatoes are washed by high-pressure streams of water from a circulating pump. Potatoes travel over rollers and rush on to sponge rubber wringers (lower left). From this machine, they go to the drying oven where the last trace of moisture is removed.

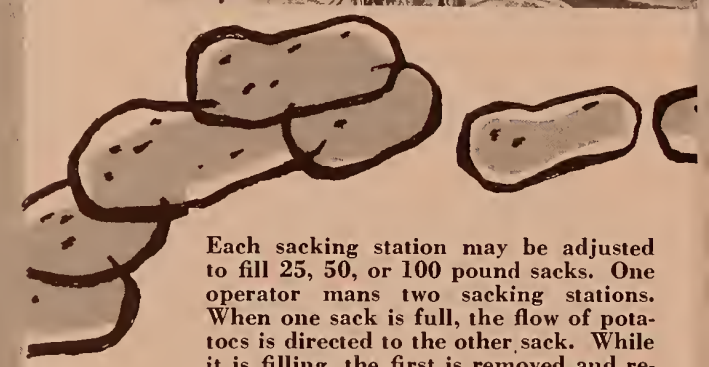
More and more rural people are realizing that they have the electric power, the knowledge, and the labor supply to do packaging and processing operations right on their farms that used to be done in towns and cities.

Eugene Horswell, who operates a potato farm near Thompson, Iowa, has not only installed an automatic washing, grading, and bagging plant, but he also designed and built most of the equipment himself.

He developed the equipment in response to demands from retail outlets for potatoes sacked in smaller amounts, ready for over-the-counter resale.

Art Mitchell, power use adviser for the Winnebago Rural Electric Cooperative Association which serves the Horswell farm, reports that electric power is used in every possible way to speed up processing of the crop after it leaves the field.

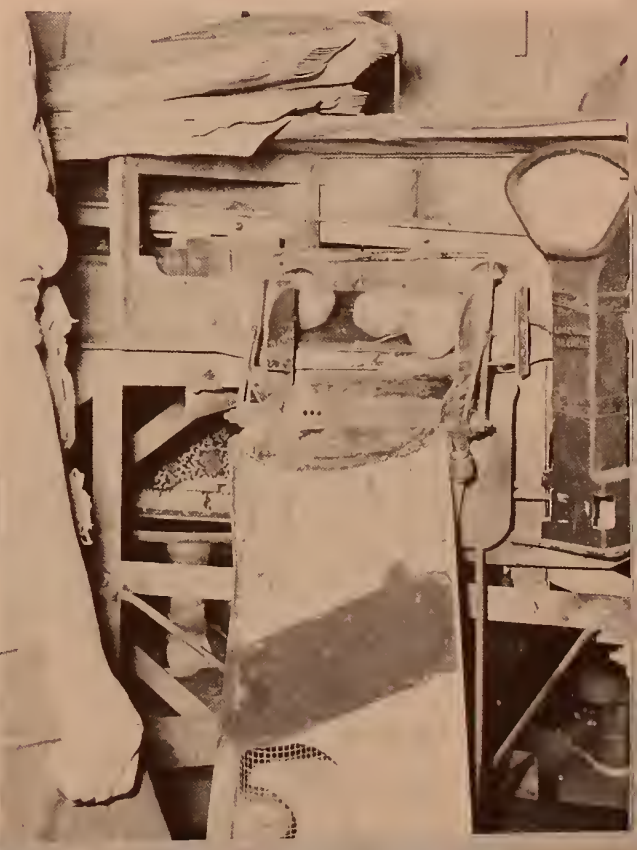
"I believe the operation is unsurpassed anywhere in the country," Mitchell adds.



Each sacking station may be adjusted to fill 25, 50, or 100 pound sacks. One operator mans two sacking stations. When one sack is full, the flow of potatoes is directed to the other sack. While it is filling, the first is removed and replaced with an empty.

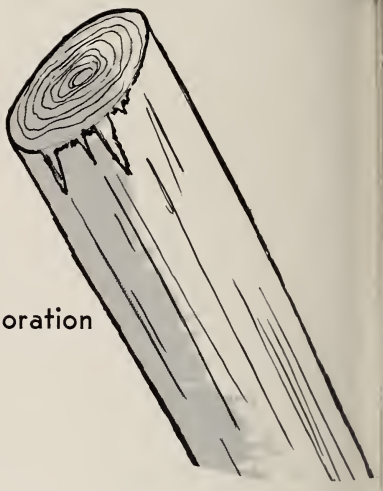
As the potatoes leave the drying oven, experienced sorters remove the seconds, which are dropped into the middle conveyor belt. Potatoes are then carried to the sacking station.

When a bag has received its full measure at automatic sacking stations, a microswitch energizes a solenoid, which raises a gate directing the flow of potatoes. All the operator has to do is attach empty bags and remove full ones.



Now We Know

Our Poles Are Safe



by J. R. Chambless, Manager
The Little Ocmulgee Electric Membership Corporation
Alamo, Georgia

WE have just completed a one-year program of checking and treating all of our poles at ground level.

I do not claim any unusual wisdom in finally ordering this job done. Rather, I should say that I was frightened into doing it. First, a defective pole fell and electrocuted a mule. Then another pole went down, killing three cows.

On the same afternoon that the cows were killed, a storm blew a tree against a line. A little boy came in contact with that energized conductor and was burned. Fortunately, he suffered no permanent injuries, though it was a miracle that he did not. His recovery was due to artificial respiration, which was promptly administered by his father.

After that afternoon, I must have asked myself a thousand times what the results would have been if the rotten pole had fallen on the boy instead of on the cows. What if his injuries

REA has long encouraged borrowers to adopt a systematic program of pole inspection and maintenance to insure safety to life and property, efficient service to consumers, and economical plant operation.

The procedure followed by Mr. Chambless is described in REA Bulletin 161-4 (or 441-1 for telephone borrowers) entitled "Pole Maintenance." In addition, there is a 16 mm. color film available called "Pole Inspection and Maintenance," in which a crew demonstrates a number of pole-saving practices. Borrowers may book the film free of charge by writing their area director, REA, U. S. Department of Agriculture, Washington 25, D. C.

Presently, an REA-backed study is under way to obtain additional information about various preservatives now available for groundline treatment. A total of 315 pole sections, including five species of poles, are being tested in Madison, Wisc., Fort Collins, Colo., and Saucier, Miss. Tests are being made to determine the performance of each preservative under varying climatic conditions, and they will not be concluded until preservatives have had sufficient opportunity to penetrate the sapwood. Upon completion in about a year, REA Bulletin 161-4 will be revised to include additional information on pole maintenance.

hadn't been due to the tree blown against the line? What if he hadn't recovered? What if his father hadn't been trained to administer artificial respiration?

Then and there, I knew it was inexcusable negligence to let such hazards continue to exist.

We quickly learned that checking and treating poles as a spare-time occupation will never get the job done. We tried this method first, and we got nowhere. Then we put a two-man crew and one truck on the job full time, pulling them off only for emergencies. Co-ops double our size might put two more full-time crews to work until the job is complete.

Our crew followed this procedure: They dug down about 18 inches around the pole, making a cone-shaped excavation. They tested the pole with a hammer, and, if in doubt about the pole's condition, they bored for a test sample.

The pole was then scraped clean of dirt and foreign material to permit as much penetration of the preservative as possible. The crew poured the preservative from a can with spout, holding it about two feet above ground level and letting it run down around the pole. Pouring was repeated four times as the dirt was replaced to get as much saturation in both pole and dirt as possible. The crew poured for the fourth time after all the dirt was piled back, leaving a small trench around the pole.

There are several types of pole preservative. The solution we used was composed of one part of pentachlorophenol #10 to ten parts of No. 2 fuel oil. Since the cost of Penta was $2.10 delivered and fuel oil was 17 cents a gallon, the cost of solution was 34.5 cents per gallon. We used two gallons for each pole, bringing the cost of solution per pole to 69 cents. Cost of labor, transportation, and solution came to $1.39 per pole, averaged over the whole job.

Each time the crew drew two gallons of solution out of the drum, they replaced the hose in the drum and pumped a few strokes to restir the mixture.

I requested the crew to check for other hazards that needed to be corrected on the lines. They also drove ground rods at transformers which were installed before specifications required rods. All this work is included in my labor costs.

As a result of the crew's work, we found that 2.3 percent of our poles were decayed enough to warrant changing out. All were changed within one or two weeks after they were spotted.

Another 3.6 percent of the poles were defective, but not suf-

Poles may appear sound but have such defects as this internal decay pocket near groundline.

Sounding with a hammer is one test of pole condition. Experienced ears can spot defective poles.

ficiently defective to change out. We painted an aluminum ring around such poles, as well as the date checked and treated. Of course, all decayed wood was removed before these poles were treated. In 2 or 3 years, the crew will return and check the marked poles for signs of further decay.

Our records were not complete enough, I am sorry to say, to report the average age of poles found defective. I believe, however, that as many poles treated in 1946 and 1947 were changed out as poles treated 8 to 10 years earlier.

I might add that on three different occasions in past years we moved poles for road construction without retreating them. In just 2 or 3 years, most of these poles were defective, and had to be replaced. Evidently, the creosote in a treated pole leaks out and disinfects the ground around it. When it is moved, you lose this protection. In this way, we learned that it is inadvisable to disturb the dirt when checking poles without treating the pole and the ground around it.

I don't know when I have been so relieved to see a job completed. All of us are sleeping easier now that it's done, for we know it takes only one defective pole to bring tragedy.

Liquid preservative is applied after pole is scraped clean of dirt and decay.

He Farms by Touch

Electricity, family and neighbors, and State officials willing to take a chance helped blind Bernard Bunfill return to the farm to operate a successful Grade A dairy.

TWO years ago, husky Bernard Bunfill began to have trouble with his vision. A truck driver in Peoria, Ill., he grew more apprehensive with each passing month.

"I could feel it coming on," Bunfill recalls. "It was gradual. At first, images blurred a little. Then I couldn't focus my eyes. It took me a long time to realize that I was losing my sight."

A physician laid it on the line. A hemorrhage in the eyes was blinding him. One eye was already useless and the other was slowly dying.

Bunfill promptly quit his job and returned to his father's farm near Cooperstown, Ill., with his wife and two sons. Frightened and discouraged, he watched the rolling hills of the Illinois River valley fade from sight forever.

"I felt pretty sorry for myself," confesses the ex-truck driver. "I didn't know what to do. I thought I was helpless. I almost went crazy thinking about going blind."

After almost a year of inactivity, a friend offered Bunfill some sound advice. He told him to get in touch with the State Rehabilitation Division in Springfield.

Bunfill found the Illinois officials "very considerate," but he failed to find the answers he was looking for.

"They wanted to send me to a school for the blind in Chicago to learn a trade," he explains. "But I refused. I didn't want to leave my home for a strange town, and I figured I was too old to learn anything new."

The State, however, was just as

Although blind, Bunfill handles all dairy chores including cleaning up. He knows by touch when utensil is clean.

Blind dairyman stands at door of combination grade A milk room and four-cow parlor which he designed.

dubious about Bunfill's suggestion, which was to stay on his father's farm and do something he already knew. As a young man, he had milked cows. Now, at 45, he felt sure he could operate a dairy. All he needed was money to get started.

Bunfill's father thought his son could do it. He arranged a loan which enabled him to buy nine dairy cows. Meanwhile the Rehabilitation Division did some checking. Two other blind men, officials learned, already were operating profitable dairies in other parts of the Nation. Perhaps, they thought, Bunfill's idea wasn't so far-fetched after all. Illinois decided to put up $3,000 to build a four-stall parlor and milkhouse and to equip it with a cooler and washing equipment.

Bunfill planned the building himself, and his family and neighbors pitched in to help construct it. From then on, the job was up to the blind dairyman. He set his jaw, picked up his cane, and walked out of his father's house to learn how to operate a dairy in the dark.

"At first, I used to spill some milk when I filled the milk cans," Bunfill reports. "And I bruised my legs bumping into the stanchions and milk cooler."

But as he kept trying, he discovered that his other senses came to his assistance.

"I have a sharper sense of feel and smell since I lost my sight," he finds. "I know just when the cans are filled and where everything is." He can tell when equipment in his Grade A dairy is clean by running his finger over it—a trick he learned years ago from a dairy inspector.

Electricity is Bunfill's silent partner in his new venture. A member of Adams Electrical Cooperative, at Camp Point, Ill., he doesn't think he could have made the grade without electric equipment.

"I flip a switch and the electric milker milks the cows. I turn a faucet and I get hot water to wash the equipment. The cooler takes care of the milk."

Even the glow of electric lights on the meter pole and in the milkhouse help Bunfill, who can still distinguish light from dark. The lights guide him to the milkhouse

Bunfill uses cane to herd one of six heifers which will help to build milk production in future.

and back to the house. An electric phonograph, lent by the State, enables him to brush up on dairy techniques by listening to recorded reports.

In addition to his dairy herd of Holsteins, Guernseys and a Jersey, Bunfill has six young heifers. With pride and confidence in his voice, he talks of production and profit and the future like any other farmer.

"I'm using artificial breeding now," he says. "My cows are averaging around 20 gallons of milk a day and I am netting a little more than $200 a month. Before long, I hope to double my production and milk at least 15 cows."

Bunfill still gets help from his youngest son in keeping dairy records, but he is studying Braille in his spare time so that he can take over this chore when his boy enters the Navy this year. He even finds time for a hobby—raising flowers. He hopes to plant roses around his dairy buildings.

"I can remember what they look like and I can at least smell them," he says.

"We're proud of Bernard Bunfill," commented Dean Searls, manager of Adams Electrical Cooperative. "These days, with so much concern about idle services, it's pretty excting to see a man like Bunfill return to the farm and make a go of it. We are very glad that electricity could help him to do it."

REA BORROWERS PURCHASING MORE POWER

Like their consumers, REA electrification borrowers continued to purchase more energy and paid less per kwh for it in fiscal 1957 than in previous years. The average cost of energy for all borrowers was 7.1 mills, an all-time low.

REA's annual analysis of borrowers' power bills shows that total energy input (purchased and generated) was 21.6 billion kwh in fiscal 1957. More than half the purchased power, 52.5 percent, came from privately owned suppliers.

The wholesale cost of power to REA's distribution borrowers declined from an average of 9 mills per kwh in 1948 to 7.4 mills in fiscal year 1957. In this period distribution borrowers increased their purchases nearly five-fold, but the total power bill of $146,737,403 in 1957 was less than four times the 1948 bill of $36,785,789.

Power-type borrowers purchased 2 billion kwh at wholesale in fiscal year 1957, at an average cost of 5.3 mills per kwh. In 1948 their purchases totaled 146 million kwh and the average cost was 10.2 mills per kwh.

Annual Report Available

Single copies of The Report of the Administrator of the Rural Electrification Administration, 1957, may be obtained by electric and telephone borrowers from Information Services Division, REA-USDA, Washington 25, D. C.

This electric broiler, converted from charcoal grill, won first place in State Fair electrical exhibits for Kenneth Schneeberger, left, shown serving hotdog to brother Charles. Electrical and other club work brought Kenneth an Oklahoma Achievement Award, free trip to National 4-H Club Congress in 1957.

The Kids Lead the Way

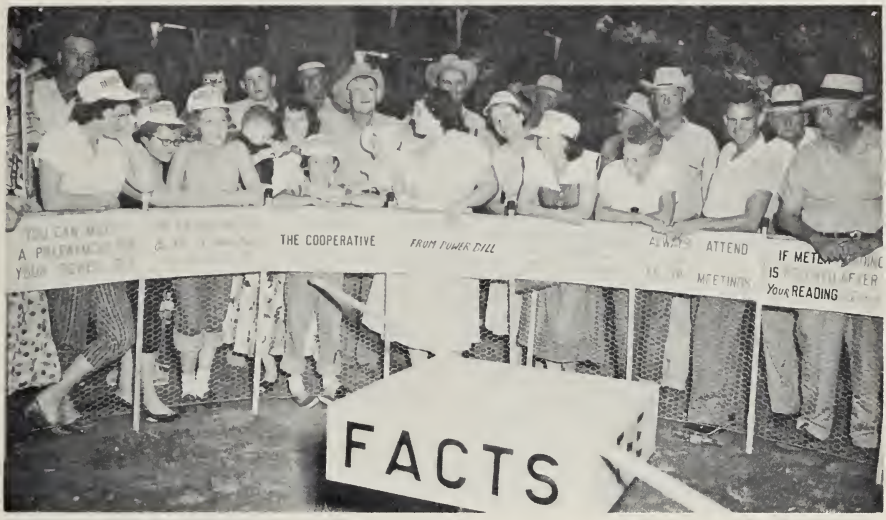
"SHOW the kids how to use electricity, and maybe they'll pass the information along to their parents," somebody suggested at the Cotton Electric Cooperative a few years ago.

The idea sparked a new power use program for the Walters, Okla., co-op, carried on for the past 5 years in 7 counties in cooperation with 4-H, FFA, school, and other youth groups.

Cotton Electric holds youth training sessions on all phases of electricity, from wiring and lighting to applications of new appliances and farm equipment. Boys and girls learn such things as motor repair, loading, sit-down ironing, and cooking with small appliances. They build their own electric equipment—things like home-made lamps and brooders. One boy recently took a charcoal broiler and converted it to electricity by installing heat lamps on a bracket above the cooking rack.

As the co-op hoped, the kids pass what they have learned along to their elders. One girl took State honors with her talk on "When Electricity Came to the Farm." She delivered her address before 6,000 members at the co-op's annual meeting.

"We are building for the future," points out Manager Don Dage. "We expect to reach 10,000



Youngsters and oldsters enjoy "The Game of Facts" and learn a few things that make Co-op operation smoother. Reward is 100-watt bulb.

young people every 3 or 4 years and to teach them the important things they should know about co-op rural electrification. These youths will make good co-op members and users when they grow up."

Cotton Electric is fortunate in having three electrical education workers who enjoy working with kids. Dage thinks that accounts for much of the success of the program. It is directed by Eugene Wetzel, superintendent of the meter and transformer shop. Wetzel gets help from co-workers Lloyd Marlett and Ronald Golden, who also make school and club visits.

These three co-op employees are always at the service of boys and girls to help them plan demonstrations and speeches, and to answer questions. Most youngsters in the area know Wetzel, Marlett, or Golden personally, since they turn up at practically any gathering where kids are present.

This year, the co-op created a Gold Award for outstanding electrical demonstrations by 4-H boys and girls in each county of the service area. Twenty-four of these attractively framed Award certificates were presented for winning projects worked out by young people during 1957, and 42 more will be made for the best projects of 1958. Six awards will be handed out in each county, going for the best demonstration by a boy, by a girl, and by boy and girl teams.

This is the first time that such

Bike generator draws long lines of kids at fairs. Trick is to pedal enough electricity to light bulb or make heater element work for a prize.

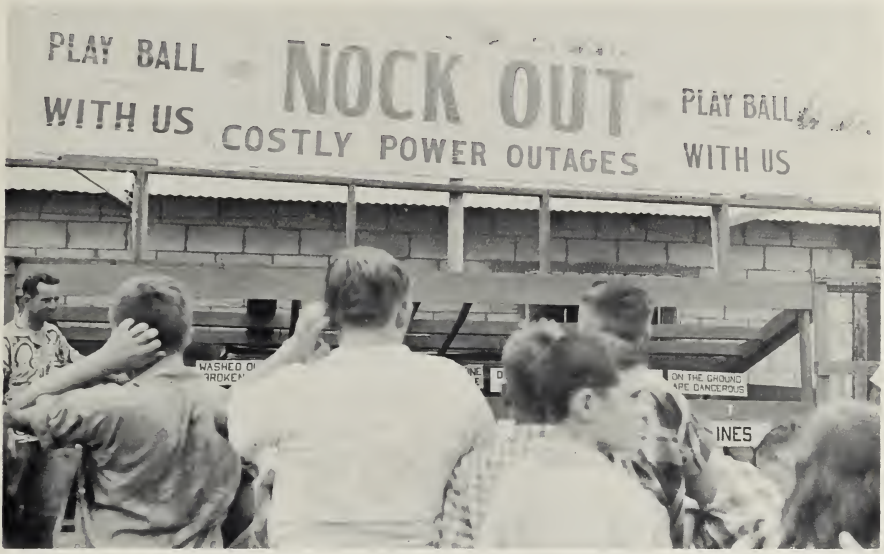
Demonstration by 4-H member gives homemakers tips on proper use of vacuum cleaner and attachments.

an incentive program for kids has been tried by an Oklahoma co-op, and it carries the endorsement of the State extension service.

Advisers appear on programs of from 200 to 300 meetings of 4-H clubs or FFA chapters each year. The results were apparent at the 1957 State 4-H Contest; demonstration teams from the Cotton Electric Area won 4 of the first 6 prizes for electrical demonstrations.

Wetzel keeps a schedule of most club meetings, and many of the clubs reserve certain months or meetings each year for appearances by the Cotton Electric personnel. One of Wetzel's most popular programs is a high volt-

Free rides on small tractors are popular with children attending annual meeting.



Boys enjoy "Nock Out" game and learn important lessons on preventing costly power outages and fatal accidents. Game is used at Co-op annual meeting and country fair displays.

age demonstration that covers everything from the risk of using a frayed electric iron cord to dangers of three limbs on wires. The show ends with sparks flying in a demonstration with a "hot" line.

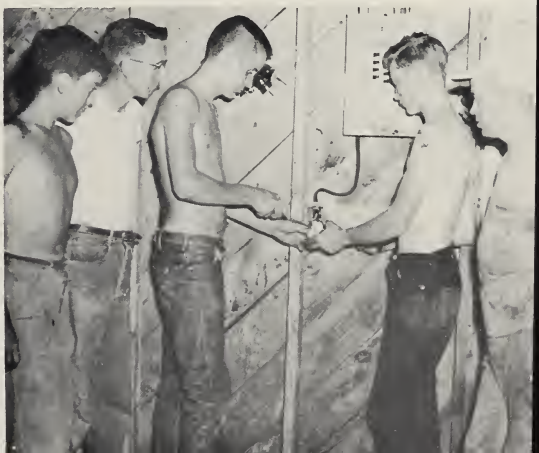
A different program is used in school classrooms. There, electrification advisers conduct 2-hour-a-day classes during one week each year in all Vo-Ag courses in the area. The instruction covers fundamentals of electricity, wiring specifications and techniques, testing for shorts, cost of operating equipment, farm applications, and workbench practice in wiring switches and building electrical equipment.

The teenagers eat it up, and they put what they learn to good use, too. Recently, three 4-H boys wired a community building in Jefferson County, under the guidance of co-op employees.

In addition to holding sessions at schools and club meetings, the co-op helps promote local Science Fairs. It donated public address equipment, personnel, and door prizes to help 450 Cub Scouts who were holding a carnival. At annual meetings the co-op rents small tractors to provide rides for children.

"Working with young people," says Manager Dage, "builds good public relations, but that isn't our main reason for carrying out this program. We believe that youth work helps the whole community, and that helps the co-op."

4-H boys wire Irving community hall under supervision of Co-op employees Marlett (center at left) and Wetzel (right).



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REA offers these tools for selling the rural telephone market: three series of posters; telephone sales promotion packet; a do-it-yourself display kit; a hand out; color movie, TELEPHONE AND THE FARMER; two exhibits (a large one for fairs, another for small space); 10-minute sales dialogue on tape for training employees; photos for sales displays. Write Information Services Division, REA-USDA, Washington 25, D.C.